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ALOHA E-SOLFÈGE RESEARCH FOR THE WEB MUSIC EDUCATION

Motto according to Kodály (1953):
"Culture means as the learning itself;
to get and to be on a level with it is difficult,
but easy to lost it." (Eösze 1977,21)

I. INTRODUCTION

Computer aided music education started in the Länsi-Uusimaa Music School in the fall of 1992 after the use of the computer classroom was made available. The principal, Jorma Mäenpää, bought the sound cards, synthesizers and music programs for each computer. The greatest problem with the computer aided music education over the past 15 years has been the high price of computer programs. The school purchased the Encore-music program, as at the time it was the most appropriate program for group instruction of music. Encore is a straight forward student friendly program in which previous computer experience is not necessary. In 2005, the school now possesses teaching material both in audio and visual forms for learning music theory and ear training. The pupils can download the demo version of Encore off the internet, allowing them to practise the exercises of the Prima Vista-books at home.

II. THE START OF THE COMPUTER-AIDED MUSIC INSTRUCTION

Using the pencil is usually a real problem in the traditional notation method. Drawing the notes to the staves can be difficult for small children. It is not accidental that Kodály suggested the first attempts in a 'transposition-notation' (Image 1), first by sol-fa syllables, later in a staff notation. The introduction of key signatures follows instruction in definite pitch (letter names). We examined the problem of the melody dictation during 1999-2005 in Lohja. Starting the primary school (at the age of 7) the majority of children cannot read or write in Finland. On the ear-training lesson we learn to sing with the sol-fa syllables according to the material of the 'Valmennus I. II.' (Preparatory books) written by Ritva Ollaranta and Maija Simojoki. Also we start the computer-aided notation on the first

lesson. Using the computer we can start with the staff notation. In the exercise paper the teacher helps them (Image 2).

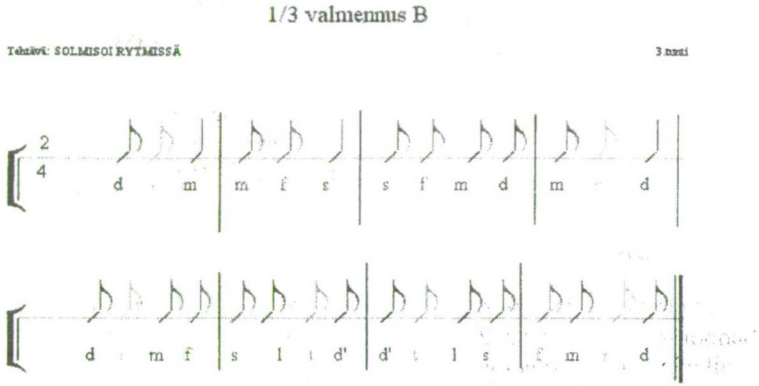

Image 1 Transposition notation

Usually the lessons start traditionally by practicing the exercises of the book for 15 minutes. In the middle of the lesson there is a little computer task according to the starting material. We always learn a little bit more and new also about technology. The third session of 15 minutes we print out all the works. Children can correct them at home and make some illustration to the songs with coloured pencils. The middle part of the lesson is interactive and personal. Finally we sing or play together the song we have been working on using our own instruments.

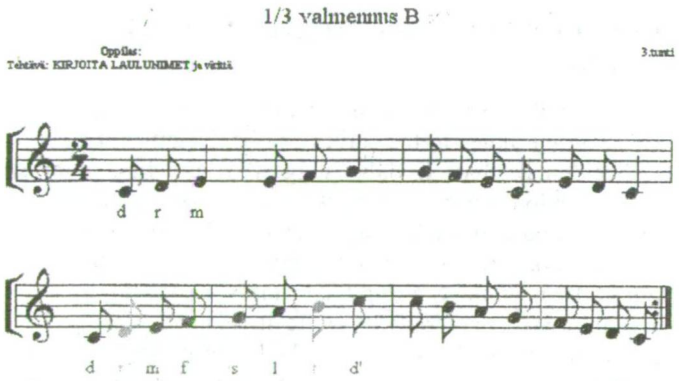

Image 2 computer-aided instruction, practise sheet

Children love colours and the well-done notations assisted by the computer motivate them. After some weeks they want to make pictures with the computer. They do not like black printings; they want to get coloured pictures. During the drawing we choose together what the theme was (autumn, winter, Christmas, and always with music). Drawing is a peaceful time to learn a new song and practice it or only to enjoy nice classical music according to the picture. Drawing is also a very important step in the developing of the "mouse using technique".

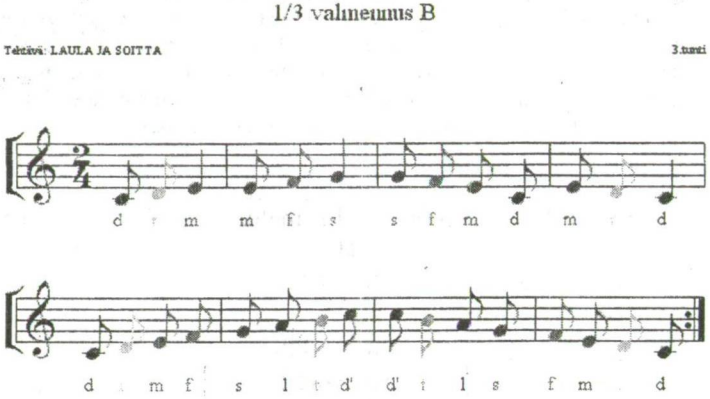

Image 3 computer-aided instruction, answer sheet

We do not use pencil for a long time, but everybody do a lot of beautiful notation on the computer. If the first experiences was successful, and only after this we start to fill the exercises in the book in a traditional way. The clear computer model is a natural guidance to using the pencil effectively. Traditional problems do not appear anymore.

III. RESEARCH ON THE COMPUTER-AIDED MUSIC INSTRUCTION

According to the words of Zoltán Kodály from 1911 (Eösze 1977):

> The only authentic aim of the music theory teaching and learning is not to make known concepts and the knowledge, but first of all the training. In every way we have to help on pupils to learn sight-reading from notes and to note the heard music. Theory and analysis are good only as much as they are necessary in the execution of the practical work (p.52).

Louhivuori (1995) says in the article of „How we learn the Melody" (Kuinka melodia opitaan):

> Traditionally the solfège education starts with well-known folk songs advancing to more difficult structured music. In this way the pupils' style-knowledge evolves, which is the prior condition of generation. At the same time the tonal assistance-points also develop before long, as the pupils learn the most general music forms. Because of the development of the process of melody writing, it would be useful to use more and more exercises where the pupils have to complete missing times, phrases, the whole melody. It could be practised e.g. when we give the pupils the assistance sounds (the basic sounds of the melody) and the pupils have to generate the missing parts between the basic sounds. By so doing we could come near to the interpretation-practice of the old music, the ornaments of the slow parts or the diminution-technique of renaissance music. (p.33-34)

Traditional:	Dictation for melody:	Computer-aided:
piano	STIMULUS	synthetic voices
linear melody:subjective	DICTATION	vertical score: objective
with paper and pencil	PROCESS	computer
by hand	OUTWARD	perfect
indirect	FEEDBACK	direct
slow	TRANSPOSITION	quick

Image 4 Students' observations about the dictation for melody (Király 2000, 25)

Didactical goals of the computer-aided music instruction, according to the pupils' opinions:

- Computer-assisted sight-singing is more easy, pleasant and effective
- The changeable colour-tones offer more versatile stimuli to one's perception
- The computer is a good aid, because of its accuracy and precision
- Computer is the stimulator of the score
- The learning-process is vertical and not linear as in a traditional methodology
- Pupils can learn in a differential task system
- Reinforcement is direct all the time because of the "tuneful" notation

Research for the learning outcomes of grade 1-3 (1/3-3/3 in Finland)

During 2002-2005, was developed and tested the Prima Vista series. The aim of the electronic ear training and music theory books are to learn to write and read the music with the help of the computer. In Finland we have only one music lesson per week, so it is very important to give the possibility for pupils to practice also at home.

Prima Vista books are exercise books and one can learn also at home. All the exercise pages are in the internet on the pages of LUMO (www.lumo.org). Pupils need only the free demo version of the Encore music software (www.gvox.com).

We started also to make movies of the lessons. We hope that in the future our pupils can learn from the internet all the lessons when they are not able to come to the lessons. We develop also a multimedia version of the materials, which is independent of any music program.

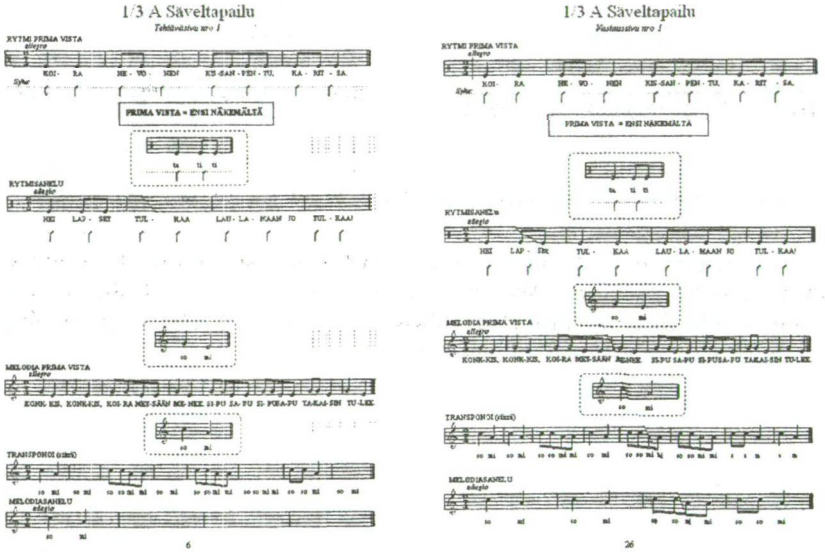

Image 5 Prima Vista 1A exercise paper of page 6 and answer paper of page 26

Books are translated in English, Swedish and Estonia. A books starts according to the Hungarian method from so-mi, this is more suitable for little children at the beginning. B books starts with the French method do-re-

mi-fa-so, which is better way for older pupils, adults and choir singers, because it goes more quickly.

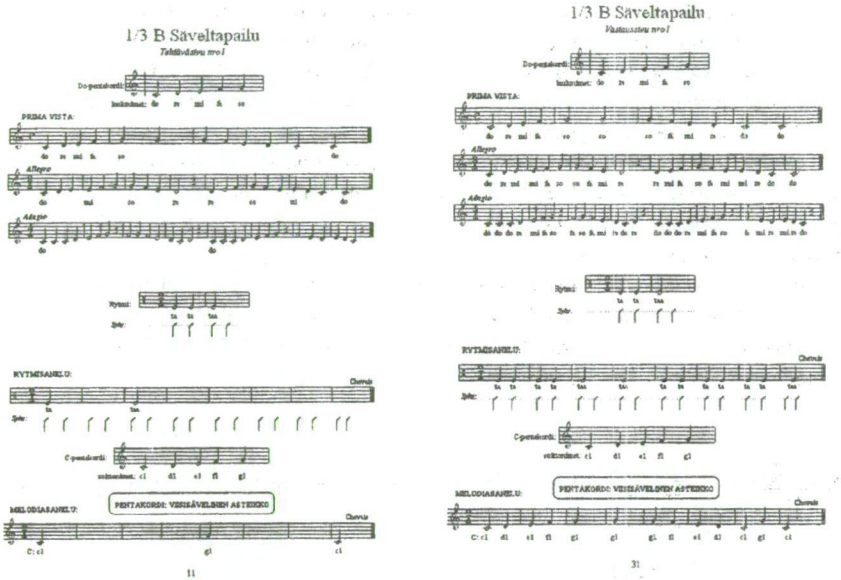

Image 6 Prima Vista 1B exercise paper of page 11 and answer paper of page 31

Very important is that using the computer as an aid, we can also listen to the note not only to see. We can practise to write the music and we can listen to. The direct control in any dictation exercise, it was never possible before in music notation teaching-learning.

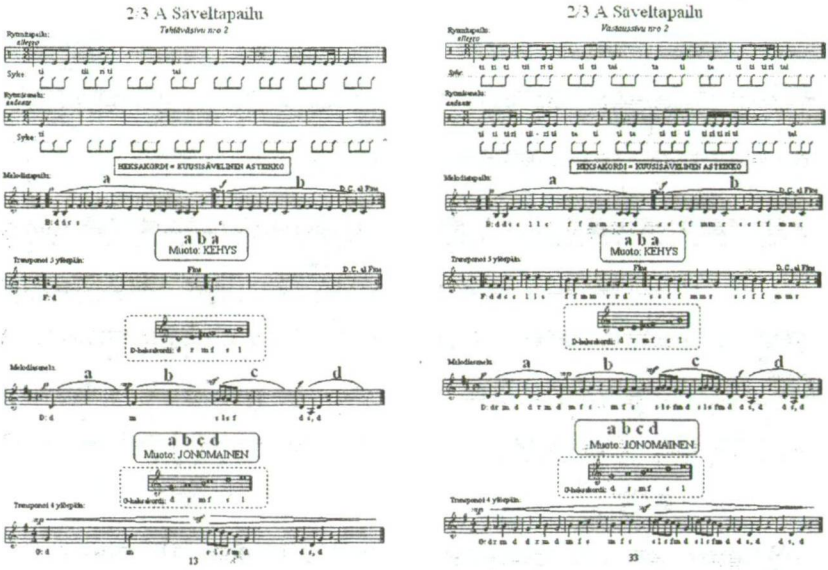

Image 7 Prima Vista 2A exercise paper of page 11 and answer paper of page 31

Prima Vista material was a good guide especially in the perception of difficult rhythm exercises. In the sight singing exercises we practise the same symbols what pupils have to recognise in the dictation.

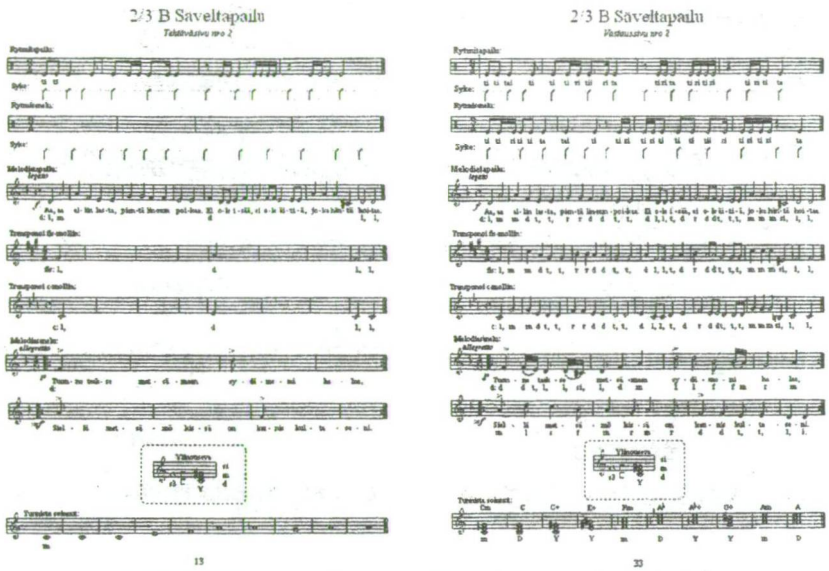

Image 8 Prima Vista 2B exercise paper of page 13 and answer paper of page 33

One can see only the empty bars on the computer (as in the exercise book), but the 'singing notes' are hided there. So pupils can practise any dictation by oneself, which is very important in this system. Pupils can write the missing notes and listen it. This is the direct control by ear. It is easy to build a chord or a scale if the total music is hided. Pupils can also open Windows/Keyboard from the music program, and they can also see if their answer is the same or not, what they wrote to the missing places.

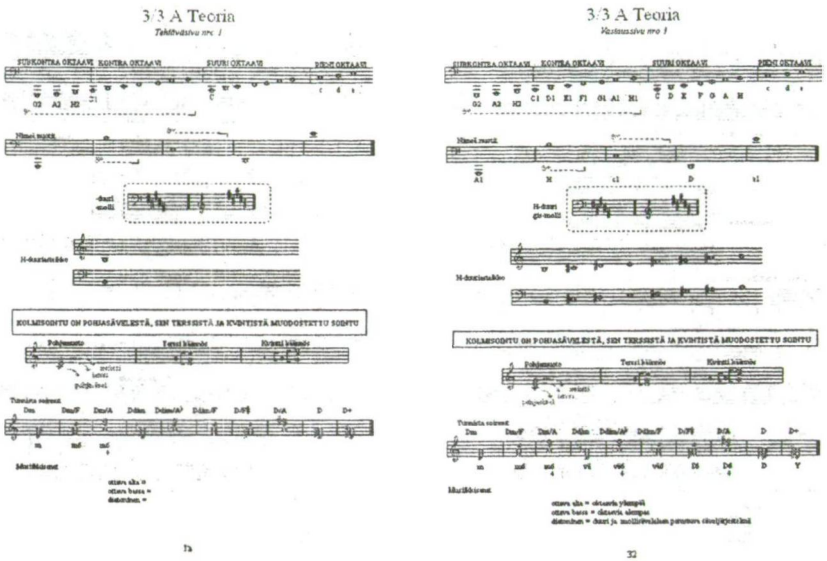

Image 9 Prima Vista 3A exercise paper of page 12 and answer paper of page 32

Another important is, that student can change the tempo, as they want. They can open the metronome from the Windows/ Tempo. At the place one can find Windows/ Staff Sheet / Program Name / Device / General MIDI one can find 128 different voice-colours if he or she doesn't like the voice what is on.

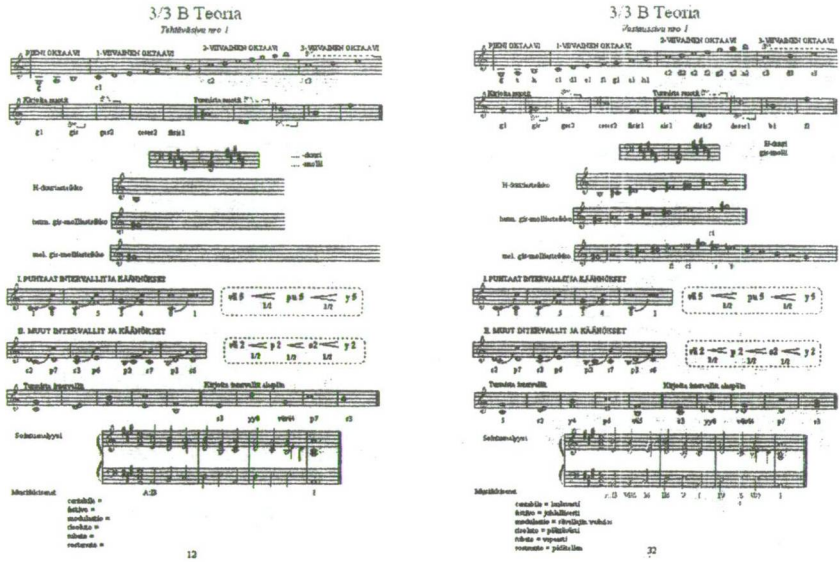

Image 10 Prima Vista 3A exercise paper of page 12 and answer paper of page 32

The hypothesis of Báthory

According to the opinions of Báthory, learning starts with a comparatively slow developmental part (the warming-up phases), which is followed by a sudden rise in performance and zoom (the learning phase), then approaching the top the success of learning slows down step by step, (the saturated phase). For the continuation of learning we have to create a new learning situation, a new warming-up phase (Image 11). Style "B" makes an effort to make precise use of the time. Typical of this is the ambition to realise the requirement rigorously and the strong-minded and systematic work of the teacher. By using the teaching time and learning time one can expect an early and quick rise in performance, which can bring about saturation comparatively early. In case of style "A" the aim of the warming-up phase is to put into place a rich stimulus-informant, which makes it possible in different ways to get acquainted with the syllabus, developing complicated associations, giving preference to personal ways chosen by the pupils. Dragging at the start is refunded later in the higher - level saturation point of the performance-level.

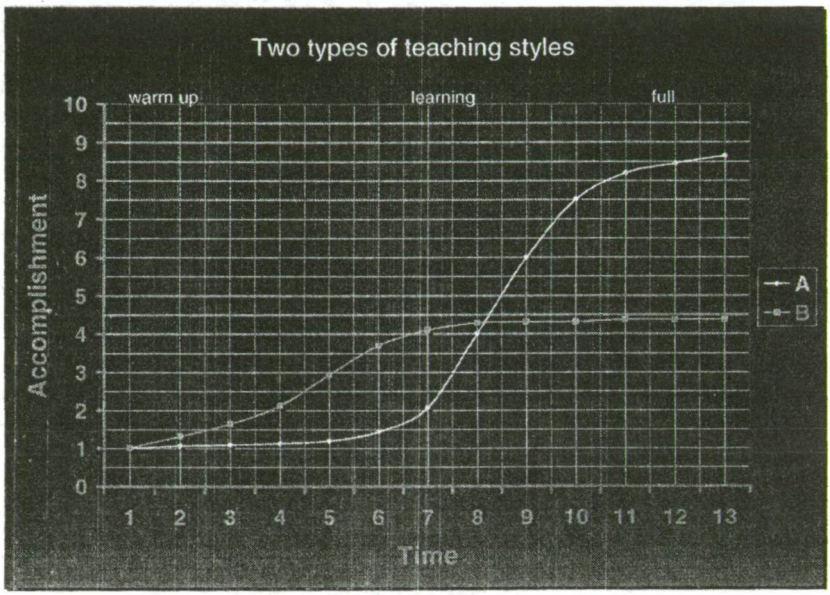

Image 11 Hypothesis of the two types teaching styles (Báthory 1992, 57).

In accordance with Báthory's hypothesis (Image 11) the educator, who regards motivation as an important task in the learning-organisation, he/she does not achieve results at the beginning, but he/she is able to achieve a high-level of development over a longer term. The learning-organisational importance of motivation lies in the careful groundwork. We can summarise the delayed starting and the possibility of quicker development later thus.

Differentiated learning-organisation

Báthory (1992) says that:

> Pedagogy is the world of differences. A very important principle of the differentiated teaching-theory knows there exist differences, their recognition and acknowledgement. The task is not how to discontinue them. (p.65).

The ordinary mode of the internal differentials takes the next three forms:

1. Hands-on (frontal) working
2. Group working
3. Personal learning (the individualising) describing and assessment

We can regard the teaching and learning with task systems as differential mode of the lesson, which makes it possible to direct the teaching towards the pupils' abilities and the rhythm of the learning. Examining the newer possibilities of the learning-organisation we have to think more of differences.

Learning method	*Learning concept*	*Differential measure*	*The premised level of the pupils' activity*	
			Looking at the persons	*Looking at the class*
Explanation	Narrow	Low	Possible	Low
Common task	Wide	Middle	Possible	High
Task system	Wide	High	General	High

Image 12 Connections between the method and the level of pupils' activity (Báthory 1992, 65).

In the independent school we can determine two areas of the learning-organisation:

1. The organisation of learning-groups and classes
2. Choosing the syllabi (subject-system) and determining the necessary learning time (teacher's schedule for the term)

The possibility of differentiation demands the autonomy of the teachers and of the schools. A basic demand is the necessary competence of the educators, to give them those programs and instruments that they need, or there is no question of difference and individualism.

The problems of the research

1. Theoretical problem was to examine if Báthory's differentiated teaching learning organization is suitable environment at the case of our research.
2. The other problem was to test how effective the Prima Vista materials are. We got the answers by analysing the pupils' learning outcomes before and after the school year.

During the school year 2004/05 we followed closely the ear training and music theory learning of the Länsi-Uusimaa Music School (LUMO), in Finland. The age of participants was between 8–16 (N=125).

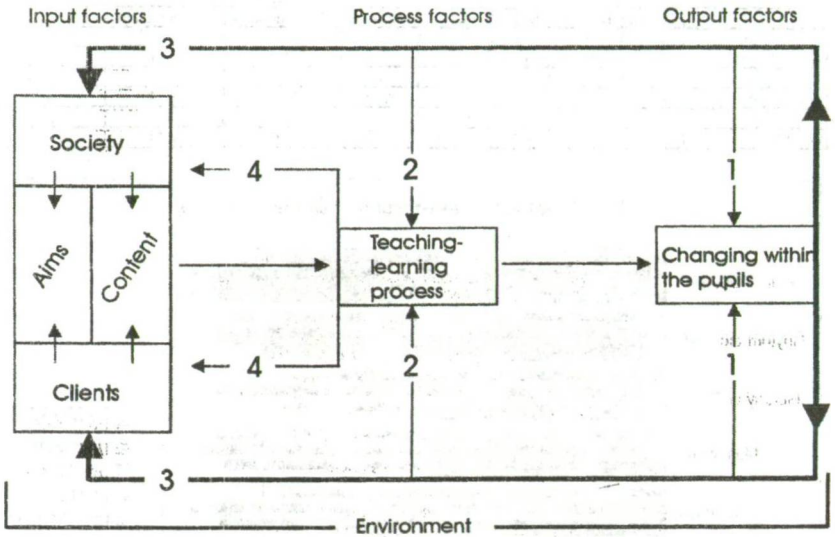

Image 13 Báthory's differentiated model of teaching learning (Báthory 1992, 20).

We used the same Prima Vista books in ear training and music theory lessons in every class of our school, but in 3 different environments:

1. Frontal teaching: in a traditional classroom without any computer ('perinteinen')
2. Group teaching: the teacher has a computer and a beamer in the room ('IT')
3. Personal teaching and learning: everybody has own work station with computer and internet

We examined the learning outcomes at the beginning of the year. All the students were learning the A part of the same level last year. B parts profound study and prepare for the final exam.

	THEORY				SOLFEGGIO			
	Octaves	Bar lines	Scales	Intervals	Mus.terms	Melody dictation	Rhythm dictation	Chords dictation
1/3 ATK 2004	24,21	50	8,27	65,26	46,84	48,68	80,92	94,21
1/3 ATK 2005	69,47	98,67	65,785	88,42	87,54	76,65	79,6	91,05
1/3 IT 2004	49,86	59,37	18,75	50	43	64,26	88,28	93,75
1/3 IT 2005	76,25	92,2	71,87	94,38	93,76	89,45	92,57	96,87
1/3 P 2004	14,29	35,72	0	58,57	48,58	57,91	84,82	92,86
1/3 P 2005	50	96,42	38,77	77,14	94,28	77,67	85,71	81,43

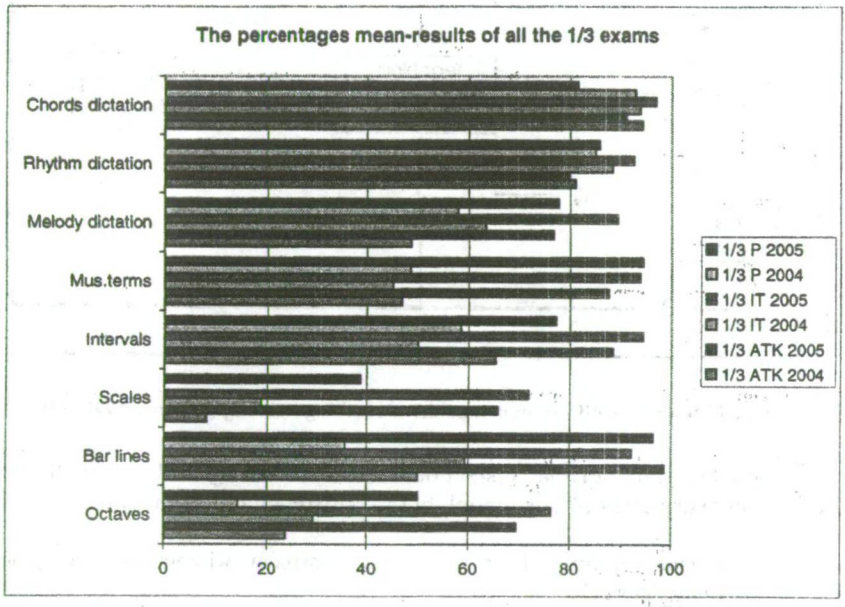

Image 14 the comparison of the result in the 1/3 groups

1/3 results (GRADE 1)

According to the means of the placement tests the Solfeggio outcomes of the 1/3 exams were very high after the first year (A level) at the field of ear training. The melody dictation developed a little bit slower as the rhythm or the chord's identifying, but after the 2nd year melody writing abilities. Theories tests show that most difficult are octaves and scales for starters. Pupils practised at home via internet with web materials and it helped a lot. We plane in the future to make multimedia exercises for practising interactively.

	THEORY					SOLFEGGIO				
	Octaves	Bar lines	Scales	Intervals	Chords	Mus.terms	Melody dict.	Rhythm dict.	Intervals dict.	Chords dictation
2/3 ATK 2004	41,11	50	25	46,167	25,56	81,66	67,71	57,63	63,43	71,67
2/3 ATK 2005	72,78	79,17	55,55	61,67	57,22	78,88	75,7	50,22	61,39	78,89
2/3 IT 2004	[illegible]	68,5	57,21	49	36	[illegible]	58,12	60,62	71,25	70
2/3 IT 2005	78,5	93,12	65	60	70,25	83,5	83,75	90	76,25	81,5
2/3 P 2004	55	56,25	32,29	46,25	26,25	85	62,5	76,56	55	76,25
2/3 P 2005	57,5	90,62	41,66	61,25	60	100	78,91	90,62	53,75	77,5

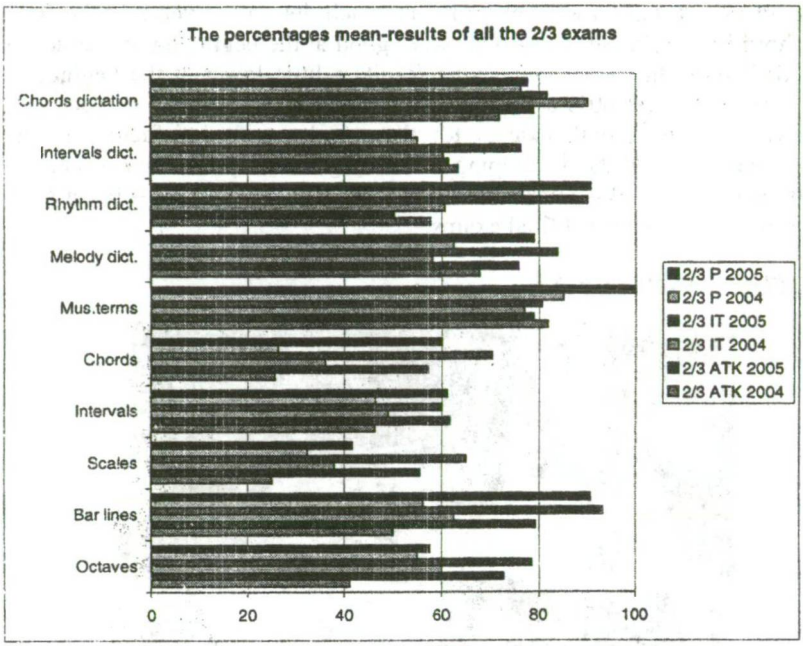

Image 15 the comparison of the result in the 2/3 groups

2/3 results (GRADE 2)

Identifying the intervals is new for the 2/3 level. The means are a little lower as the other Solfeggio test result. Chords and Rhythm are better as melody dictation, which develops slower as the others. Theory results are better as at the beginning especially octaves and scales. Building the Chords was new and results are low in the placement exam. In the final exam developed in every group over 60 %.

3/3 results (GRADE 3)

Identifying Cadences is usually difficult for students. In the IT groups (teacher has a computer and a beamer) surprising good results came already in the placement tests. ATK and traditional groups were bad at the placement test, but they developed very much during the year. At the field of chord identifying all the groups were good at the beginning and better in the final tests. Intervals' identifying results a little lower at the beginning, but means are over 60% at the exam in spring. Melody dictation went well in every group in both exams. Rhythm results were satisfactory in the placement tests and the developing was very good. Maybe theory placement tests were quite bad – musical terms and chords recognising – but after 1 year came almost perfect final exams.

IV. THE CONCLUSIONS

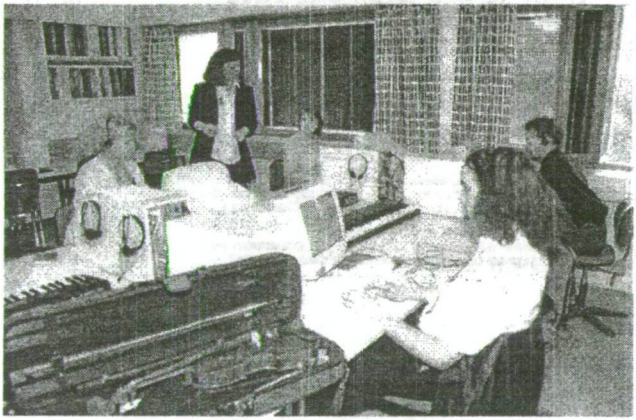

Image 16 Solfège in the computer classroom

Báthory's differentiated model works in the case of our research. Computer classroom is a suitable environment to learn the music theory and ear training. Prima Vista materials worked brilliantly in every environment (frontal, - IT group and ATK personal). Exam results were very high. The best result and developing seems to be in the IT group teaching (teacher has a computer and a beamer). Developing of the musical ability needs time; we need good web materials which our pupils can also practice at home. They hope yet to get interactive multimedia CD and DVD teaching-videos to see the lessons again at home.

	THEORY						SOLFEGGIO				
	Octaves	Bar lines	Scales	Intervals	Chords	Mus.terms	Melody dict.	Rhythm dict.	Intervals dict.	Chords dict.	Cadence dictation
1/3 ATK 2004	50	26,92	25,38	48,84	16,92	9,61	68,75	32,69	39,23	70,76	26,06
1/3 ATK 2005	73,8	82,75	70	61,15	63,08	74,62	61,06	72,6	64,23	83,46	70,94
1/3 IT 2004	71,67	62,5	57,33	56,5	71,67	69,67	67,14	53,24	53,57	66,35	76,05
1/3 IT 2005	78,33	100	60	61,66	74,16	76,66	79,16	79,16	61,66	87,5	76,03
1/3 P 2004	74,28	55,57	47,14	47,14	18,57	13,57	67,85	54,46	52,85	71,42	34,12
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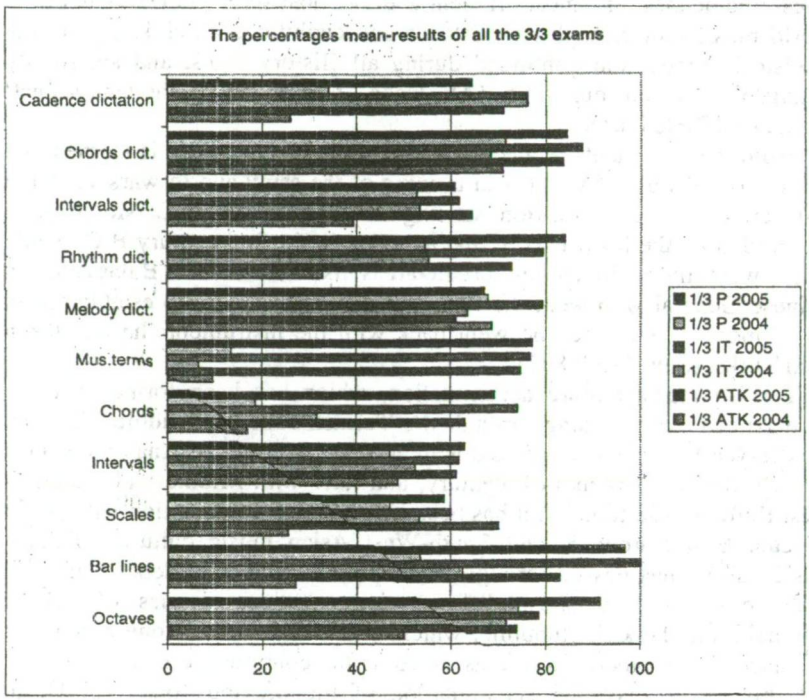

Image 17 the comparison of the result in the 3/3 groups

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